

WHAT IS CLAIMED IS:

1. A method for detecting a physical attribute of a manufactured object using an energy measuring device, the method comprising:

measuring energy from the manufactured object with the energy measuring

5 device to obtain a measured signal indicative of the physical attribute; and

comparing the measured signal to an expected result; and

determining the physical attribute based on the step of comparing.

2. The method of claim 1, the method further comprising:

generating the expected result from a mathematical model.

3. The method of Claim 1, the method further comprising:

deriving the expected result from empirical tests.

4. The method of claim 1, the method further comprising:

displaying the physical attribute.

5. The method of Claim 4 wherein the display is a C-scan.

6. The method of Claim 4 wherein the display is a B-scan.

7. The method of Claim 4 wherein the physical attribute is displayed as a three dimensional image in relation to the geometry of the manufactured object.

8. A system for the detection of a physical attribute of a manufactured object,
the system comprising:

a sonic measuring device;

the sonic measuring device detecting a signal indicative of the physical attribute;

the sonic measuring device generating a measured result associated with the
signal;

a signal analyzer, communicatively coupled to the sonic measuring device, that is
operable to receive the measured result;

an expected result;

the signal analyzer comparing the expected result to the measured result,
automatically; and

the signal analyzer producing a comparison of the measure result and the
expected result.

9. The system of Claim 8, the system further comprising:

a model processor communicatively coupled to the signal analyzer; and

the model processor generating the expected result from a representation of the
manufactured object.

10. The system of Claim 9 wherein the representation of the manufactured
object is a computer-aided-drafting representation of the manufactured object.

11. The system of Claim 9, the system further comprising:

a programmable circuitry coupled to the model processor; and

the model processor generating the expected result with the programmable circuitry.

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12. The system of Claim 9, wherein the representation of the manufactured object is stored on a readable medium, the readable medium being communicatively coupled to the model processor; and

the model processor generating the expected result from the stored representation of the manufactured object.

13. The system of Claim 8, the system further comprising:

a display communicatively coupled to the signal analyzer; and

the display displaying the comparison of the measured result and the expected result.

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14. A system for comparing measurements from an ultrasound testing system,

the ultrasound testing system testing manufactured object for physical characteristics and detecting a signal generated on or in the manufactured object, the system

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comprising:

a signal analyzer that compares a predetermined expected result with a measured result;

the measured result associated with the signal detected by the ultrasound testing system; and

the predetermined expected result associated with the manufactured object having a certain characteristic.

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15. A method for detecting a physical attribute of a manufactured object using a sonic measuring device, the sonic measuring device measuring sonic energy from the manufactured object and obtaining a measured signal, the method comprising:

comparing the measured signal to an expected result; and

determining the physical attribute based on the step of comparing.

16. The method of Claim 15, the method further comprising:

generating the expected result from a mathematical model.

17. The method of Claim 16 wherein the comparison is selectively repeated, the expected result being repeatedly generated from an iteratively adapted mathematical model, the comparison being selectively repeated until a quantifier indicative of the comparison has a predetermined value.

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18. The method of Claim 15, the method further comprising:

deriving the expected result from empirical tests.

19. The method of claim 15 wherein the comparison is selectively repeated, the expected result being selected from a set of predetermined expected results, the comparison being selectively repeated until a quantifier indicative of the comparison has a predetermined value.

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20. The method of Claim 15, the method further comprising:
displaying the physical attribute.

21. The method of Claim 20 wherein the physical attribute is displayed on a C-scan.

22. The method of Claim 20 wherein the physical attribute is displayed on a B-scan.

23. The method of Claim 20 wherein the physical attribute is displayed in a three dimensional representation relative to the geometry of the manufactured object.

24. A system for the detection of a physical attribute of a manufactured object wherein a sonic measuring device measures a sonic energy from the manufactured object and produces a measured signal, the system comprising:

a signal analyzer communicatively coupled to the sonic measuring device and operable to receive the measured signal;

an expected result;

the signal analyzer comparing the expected result to the measured result automatically; and

the signal analyzer producing a comparison of the measured signal and the expected result.

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25. The system of Claim 24, the system further comprising:

a model processor communicatively coupled to the signal analyzer; and

the model processor generating the expected result from a representation of the manufactured object.

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26. The system of Claim 25 wherein the representation of the manufactured object is a computer-aided-drafting representation of the manufactured object.

27. The system of Claim 25, the system further comprising:

a programmable circuitry communicatively coupled to the model processor; and

the model processor generating the expected result with the programmable circuitry.

28. The system of Claim 25 wherein the representation of the manufactured

object is stored on a readable medium, the readable medium being communicatively coupled to the model processor and the model processor generating the expected result from the stored representation of the manufactured object.

29. The system of Claim 24, the system further comprising:
a display communicatively coupled to the signal analyzer; and
the display displaying the comparison of the measured signal and the expected
result.

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30. The system of Claim 29 wherein the display is a C-Scan.

31. The system of Claim 29 wherein the display is a B-Scan.

32. The system of Claim 29 wherein the display displays the comparison as a
three dimensional image relative to the geometry of the manufactured object.

33. A system for the detection of a physical attribute of a manufactured object
wherein a sonic measuring device measures a sonic energy from the manufactured
object and produces a measured signal, the system comprising:

a signal analyzer communicatively coupled to the sonic measuring device and
operable to receive the measured signal;

a model processor communicatively coupled to the signal analyzer;

the signal analyzer comparing an output of the model processor to the measured

result automatically; and

the signal analyzer producing a comparison of the measured signal and the
output of the model processor.

34. The system of Claim 33 wherein the model processor generates the output of the model processor by solving a mathematical model.

35. The system of Claim 34 wherein the comparison is selectively repeated using the output of the model processor selectively repeatedly generated by adapting a parameter of the mathematical model in response to the comparison of the measured signal and the output of the model processor.

36. The system of Claim 35 wherein the physical attribute of the manufactured object is determined from the value of the parameter of the mathematical model.

37. A method for detecting a physical attribute of a manufactured object wherein a sonic measuring device measures a sonic energy from the manufactured object and produces a measured signal, the method comprising:

comparing the measured signal to an output from a model processor with a signal analyzer; and
producing an output from the signal analyzer indicative of the step of comparing.

38. The method of Claim 37 wherein the steps of comparing and producing are selectively repeated, the comparing being of the measured signal and the output from the model processor, the model processor selectively changing the output in response to the output from the signal analyzer.

39. The method of claim 38 wherein the model processor selectively changes the output by adaptively changing a parameter in a mathematical model and determining the output from the mathematical model.

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40. The method of Claim 38 wherein the model processor selectively changes the output to one of a plurality of predetermined outputs.

41. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform the method steps for detecting a physical attribute of a manufactured object using a sonic measuring device, the sonic measuring device measuring sonic energy from the manufactured object and obtaining a measured signal, said method steps comprising:

comparing the measured signal to an expected result; and

determining the physical attribute based on the step of comparing.

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